

THE

Open Reading Frame

Newsletter of the Genetics Section of the American Fisheries Society

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President's Message

I would like to start off this newsletter by drawing your attention to our new title and new look thanks to Jared Homola's hard work. If you have any thoughts or helpful comments about the newsletter please feel free to pass them along.

The Section would like to thank everyone who has renewed their Section and Society membership (and if you have not, just click here https://secure.

fisheries.org/MemberResponsive/ MyAccount/Sign In.aspx). Your dues are important to the Section because they allow us to offer awards for students and young professionals such as the James



Dr. Wendylee Stott AFSGS President

E. Wright Graduate Award and the Early Career Award. This year we are offering, with help from partners, additional one time travel awards to the 13th International Symposium on the Biology and Management of Coregonid Fishes (http://www.coregonid2017.com/travel-assistance-awards.html) and Western Division AFS meeting (http://wdmtg.fisheries.org/genetics-travel-award/). Travel to meetings gives students a great opportunity to meet potential supervisors, employers, fellow students and to develop professional networks that can last for their entire career.

Continued on next page

TAMPA, FLORIDA
AUGUST 20-24, 2017

AMERICAN FISHERIES SOCIETY

March 17, 2017

Symposium, contributed paper and poster abstracts due

Details at afsannualmeeting.fisheries.org

President's message cont'd

The Section is sponsoring or co-sponsoring three symposia at the annual meeting; a tribute to Tim King, a tribute to John Gold, and Imperiled Aquatic Species from Headwaters to Oceans: a genomics perspective. The annual meeting is August 20th to 24th in Tampa FL this year (https://afsannualmeeting.fisheries.org/) and the March 17th abstract submission deadline is fast approaching.

We are living in interesting times; there are many challenges, but also many new opportunities for everyone regardless of where you are in your career trajectory. I would like to encourage you all to continue the research that has earned the Genetics Section a great reputation within and beyond the American Fisheries Society. Please continue to engage in civil discourse in person and on all your favorite platforms. Finally, be sure to stay rested, healthy (sorry if I sound like your mum) and whenever possible just go outside and remember why you got into fisheries research in the first place.

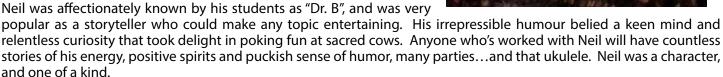
Please send information on symposia, jobs, articles, and calendar events to jared.homola@maine.edu to see it published in the next newsletter!

Farewell to Neil "Dr. B" Billington

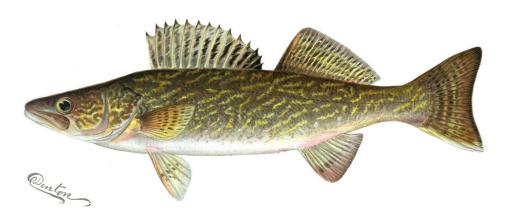
By Chris Wilson and Brian Sloss

Neil Billington, irrepressible jongleur, raconteur, and scientist, died unexpectedly of natural causes at home in January.

Neil came to fish genetics by a roundabout route, but made lasting contributions. Before coming to Canada to work on walleye genetics, his PhD at the University of Loughborough in England focused on the community ecology of phytoplankton. His postdoctoral fellowship at the University of Windsor was the first work on walleye zoogeography and stock structure using mitochondrial DNA, just before the PCR revolution. He continued this work as a research associate at the University of Guelph before moving to the USA, where he taught at several academic institutions before putting down roots at Troy State in Alabama. Although fish genetics was his primary focus, he enjoyed some diversions into the genetic structure and diversity of zooplankton and velvet worms along the way.







Genetics Section Seeks Award Nominations

James E. Wright Graduate Award

The James E. Wright Graduate Award is given in the memory of Jim Wright, one of the founders of fish genetics research and education in North America. The work of Jim Wright and his students combined classical chromosome studies with allozyme inheritance and helped shape our understanding of the salmonid genome. The award is presented annually at the Genetics Section meeting during the AFS Annual Meeting to recognize excellence in graduate-level work in fisheries genetics and to assist graduate students with travel to the national meeting.

Application procedure: Applicant must be a full or affiliate member of the AFS Genetics Section at the time of application. Application package should include: 1) Brief curriculum vitae including anticipated degree, completion date, and career goals. 2) Statement of the thesis or dissertation and abstract of progress to date. 3) Names and addresses of two references familiar with the applicant's background and abilities. 4) Statement of previous service to the AFS, its Sections, or its Chapters, and need for travel assistance. 5) Statement addressing anticipated contribution to the upcoming meeting

For additional details, see the Genetics Section's <u>Awards</u> webpage.

All application materials should be sent via email to: Andrea Schreier (amdrauch@ucdavis.edu)

AFS Genetics Section Hall of Excellence

The AFS Genetics Section Hall of Excellence recognizes professionals who have made outstanding contributions to the advancement of management or conservation of aquatic species and ecosystems through the application of genetics tools, techniques, or theory. Up to four inductees are entered into the Hall of Excellence per year. Current inductees can be found in the Virtual Hall of Excellence on the Section's website.

Nomination procedure: Nominations for the Hall of Excellence award can be provided by any Genetics Section member and are due to the Genetics Section President-Elect by 15 April of each year. New for 2017, packages for nominees not inducted can be updated and rolled over for consideration for up to two years.

For additional details for nominations, see the Genetics Section's <u>Hall of Excellence webpage</u>.



Genetics Section Early Career Award

The Genetics Section Early Career Award is given annually and recognizes the contribution of early-career researchers to the field of fisheries genetics. The goal of this award is to promote innovative and particularly applicable genetics research, increase interest in fisheries genetics careers, and enhance professional connections among fisheries geneticists. The candidate's genetics work should be applicable to the Society's mission to "improve the conservation and sustainability of fishery resources and aquatic ecosystems by advancing fisheries and aquatic science". The award will be presented at the Genetics Section meeting during the AFS Annual Meeting.

Eligibility: There are no restrictions on nominators. A nominee must be a full or affiliate member of the AFS Genetics Section and must be within five years of having completed graduate training, including post-doctoral research, and in the initial stages of career development whether that be in an academic, agency, NGO, or other conservation setting.

For additional details for nominations, see the Genetics Section's <u>Awards webpage</u>.

American Fisheries Society

Nominations sought for Society Awards including:

- Award of Excellence
- · Carl R. Sullivan Fishery Conservation Award
- Distinguished Service Award
- Meritorious Service Award
- Many others!

Nominations are due April 1st See <u>fisheries.org/about/awards-recognition/</u> for details

AFSGS Sponsors Three Sympoia

The Genetics Section will be sponsoring or co-sponsoring three symposia at the 2017 AFS Annual Meeting in Tampa, Florida. Symposia abstracts and organizers are listed below.

Conservation Genetics of Imperiled Fishes: A Tribute to Dr. Tim King

Organized by Stephen Faulkner, David Kazyak, Carol Stepien, and Wendylee Stott



This symposium will honor the career and contributions of the late Dr. Tim King to the field of conservation genetics. Tim founded the conservation genetics and genomics laboratory at the USGS Leetown Science Center, and played an instrumental role in developing and applying genetic tools to aid in the management of many at-risk taxa. In the fisheries arena, he was a key leader in the Atlantic Salmon, Brook Trout, and sturgeon communities. Tim also provided scientific support for research on many other aquatic species, ranging broadly from horseshoe crabs to Pacific walrus to freshwater mussels. In recent years, he championed initiatives to transition from conservation genetics to conservation genomics. Tim's research has produced over 100 publications and continues to guide the conservation of threatened and endangered species. He was a patient mentor to many, and worked with countless colleagues as a tireless advocate for the application of molecular approaches to aid in conservation. In this symposium, Tim's contributions to fisheries science and conservation genetics will be highlighted in memory of a wonderful colleague, friend, and mentor.

Imperiled Aquatic Species from Headwaters to Oceans: A Genomics Perspective

Organized by Marlis Douglas, Michael Douglas, Andrew Whiteley, and Gene Wilde

Freshwater ecosystems are among the most altered habitats – much to the detriment of many aquatic species, many of which are ill equipped to cope with the rapid global changes that define the Anthropocene. Over the last 30 years, genetic approaches have been used extensively to study imperiled species, and to provide insights on their population structure, phylogenetic relationships and ecologies.

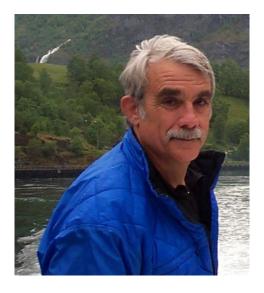
The Imperiled Aquatic Species Section of the American Fisheries Society was established to: (a) promote conservation of aquatic imperiled species, and (b) help build management capacity and leverage conservation issues within the professional fisheries community. These will hopefully focus attention by conservation practitioners with regard to native fishes, mollusks, and other rare organisms under threat. The Genetics Section of AFS was established to (a) provide a better understanding of the role of genetics and genomics in aquatic sciences, fisheries management, and aquaculture, (b) encourage protection of the genetic resources of aquatic species, and (c) promote the accumulation, synthesis, and exchange of genetic information concerning aquatic organisms and their management.

A symposium co-organized by the AFS Genetics and Imperiled Aquatic Species sections is germane, particularly given the close and long-standing relationship that has been established between conservation genetics/genomics and imperiled aquatic species. The symposium will showcase the manner in which collaborations among conservation practitioners and genetic researchers have promoted the management, protection, and recovery of imperiled aquatic species. Contributors will elaborate on (a) aquatic biodiversity that extends from headwaters to oceans, (b) newest genomic approaches that provide novel insights into their ecologies and evolutionary histories, and (c) horizon-scans that incorporate joint endeavors among conservationists and geneticists going forward. Participants will gain insight on commonalities and differences associated with working on imperiled aquatic taxa from small headwater streams to the open ocean.

From Headwaters to the Sea and Karyotypes to Genomes: A Symposium in Honor of John Gold

Organized by Thomas Turner, David Portnoy, and Kevin Conway

Fishery genetics has made sweeping transformations from characterization of karyotypes to comparison of fully assembled genomes to solve fundamental problems in understanding biodiversity and evolutionary processes in marine and freshwater systems. It is a rare scientist who is on the cutting edge of the field each step of the way. Dr. John Gold's career spans 40 years and over 250 peer-reviewed publications in molecular approaches to population genetics, conservation genetics, biogeography, and systematics of fishes and fisheries. Over the years, his laboratory has had enormous impacts in the application of allozymes, mtDNA, microsatellites, and, most recently, next-generation sequencing data to some of the most vexing problems in fisheries biology. Most recently, his laboratory has developed a dense SNP-based linkage map of red drum that will allow credible translation of genome to phenome



to understand the nature of adaptive evolution in the sea. His work also has revealed important new insights into systematics and biodiversity of stream fishes of the southwestern United States, where most fishes are now imperiled by land use transformation, water extraction, and climate change.

In honor of Dr. Gold, this symposium will highlight recent advances in genetics and genomics in theory and practice as applied to problems in freshwater and marine fish and fisheries. Over 20 speakers will discuss topics that range from discovery of new freshwater biodiversity, to evaluation of population structure and evolutionary dynamics of marine species, to genetic responses of fishes to pollutants and other environmental disturbances. Speakers will place special emphasis on integrative approaches that consider demography, environmental variation, and time series to understand the tempo and trajectory of biodiversity accumulation and genetic change.



Great Lakes Fishery Commission Travel Award

Application Deadline: Applications must be received electronically by Friday, April 14, 2017, 11:59pm ET. Send application to research@glfc.org; SUBJECT: Travel Award.

Purpose: The Great Lakes Fishery Commission (GLFC) Travel Award seeks to promote academic excellence by encouraging student scientists to present their graduate research results at scientific conferences. The Travel Award is awarded annually to M.Sc. or Ph.D. students whose research is likely to make a significant contribution to understanding Great Lakes aquatic ecology and fishery science.

Number and Value of Awards: Two travel awards will be awarded this year. Typically awards are for up to \$1,500.

Eligibility: Full-time M.Sc. or Ph.D. students whose research is relevant to the Great Lakes and who have not previously received this award are eligible.

Award winners announced mid-May 2017

Additional application details are provided at http://www.glfc.org/research/Travel.pdf

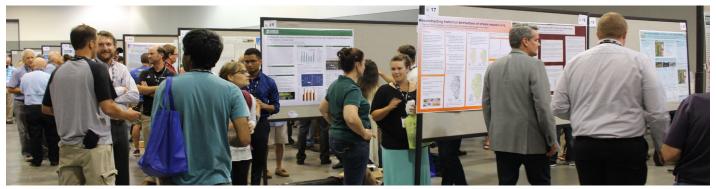


Photo by Beth Beard, AFS

Calendar

March 2017

17th *Abstract Deadline*: Contributed paper and poster abstracts 147th Annual Meeting of the American Fisheries Society

April 2017

4th - 7th *Symposium*: Genomics of migration. Max Plank Institute, Plön, Germany

May 2017

15th - 19th *Meeting*: IAGLR's 60th Annual Conference on Great Lakes Research. Detroit, Michigan.

20th *Abstract Deadline*: Evolution 2017. Portland, Oregon.

22nd - 25th *Meeting*: AFS Western Division Annual Meeting. Missoula, Montana.

June 2017

7th - 9th *Meeting*: 11th International Workshop on Lobster Biology and Management. Portland, Maine.

23rd - 27th Meeting: Evolution 2017. Portland, Oregon.

<u>July 2017</u>

2nd - 6th *Meeting*: Annual Meeting of the Society for Molecular Biology and Evolution. Austin, Texas.

3rd - 7th *Meeting:* Fisheries Society of the British Isles 50th Anniversary Conference. Exeter, UK.

23rd - 27th *Meeting*: International Congress for Conservation Biology. Cartagena Colombia.

August 2017

6th - 11th *Meeting*: Ecological Society of America Annual Meeting. Portland, Oregon.

20th - 24th *Meeting*: 147th Annual Meeting of the American Fisheries Society. Tampa, Florida.

September 2017

10th - 15th *Meeting*: 13th International Coregonid Symposium. Bayfield, Wisconsin.

18th - 21st *Meeting*: ICES Annual Science Conference. Fort Lauderdale, Florida.

26th - 29th *Meeting*: Wild Trout Symposium XII. West Yellowstone, Montana.

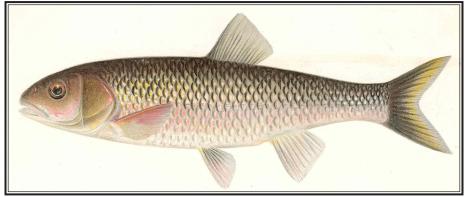


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To find dates and information for AFS chapter meetings, visit <u>fisheries.org/about/units/chapters/</u>

Jobs

Graduate student positions

MS position - Cisco genomics in the Larson Lab at the University of Wisconsin-Stevens Point (UWSP)

Responsibilities: Restoration of cisco is a major emphasis for multiple agencies across the Great Lakes. One major impediment to these restoration efforts is uncertainty surrounding species classifications. Specifically, it is unclear whether the different cisco species in the Great Lakes are a product of phenotypic plasticity or are maintained through adaptive genetic differences. The successful candidate will create a genetic linkage map that can be used to investigate adaptive differentiation among cisco species in the Great Lakes. Field work will be minimal and will include making cisco experimental crosses. Laboratory work will consist of constructing restriction-site associated DNA (RAD) libraries to send out for high-throughput sequencing. Bioinformatic analysis will involve using programs such as STACKS and Lep-MAP to analyze RAD data and construct a linkage map. A background in genetics including laboratory and data analysis skills is preferred but not required. This project is part of a collaboration between Wes Larson at the USGS Wisconsin Cooperative Fishery Research Institute and Wendylee Stott at the USGS Great Lakes Science Center. The successful candidate will spend time at both locations but will be primarily based out of UWSP. Qualifications: B.S. in biology, fisheries, or a related field. GPA of 3.0+, GRE of 300+ Background in genetics strongly preferred. Experience with computer programming and analysis of large datasets is also desirable. Salary: \$16,000 per year (2 yr) plus tuition remission. Closing date: April 1, 2017. Position will start

in September 2017 but there may be an opportunity to work in the Larson Lab during summer 2017 before the position starts. **Contact:** Please send CV, transcript copies, GRE scores, and names and contact information for 3 references (names only) to Wes Larson (Wes. Larson@uwsp.edu). **Web Links:** https://weslarson.wordpress.com/;; https://www.glsc.usgs.gov/personnel/1121

Dynamcis of small, persisting populations. PhD or MSc position at Concordia University, Montreal, QC.

We are seeking a dynamic student to investigate significant yet understudied component of conservation biology: mechanisms that may allow some small, isolated populations to persist in the face of environmental change. Core topics on natural fish populations would include: (i) Effectiveness of purging of inbreeding depression (ii) Epigenetic maintenance of genetic diversity via DNA methylation (iii) Population persistence despite maladaptation. This is a collaborative research project between Dr. Dylan Fraser (Concordia U.) and Dr. Louis Bernatchez (Laval U.) with funding for 4 years (PhD) or 2 years (MSc). Stationed out of Concordia U. (Montreal) with additional research training at Laval U. (Quebec City), the student will benefit from the expertise of two leading conservation genetics laboratories. The student will conduct field, commongarden and genomic work on a series of small, isolated brook trout populations from Cape Race, Newfoundland. Interested candidates should have: a keen interest and background in conservation genetics and genomics, quantitative skills (e.g. R stats), effective oral and written communication, and autonomy; experience

with fish husbandry is an asset. Speaking French is not required but encouraged. The start date is May 2017. Interested applicants should send (electronically) a cover letter, CV, unofficial transcripts and names of two academic or research references to: Dylan Fraser, Associate Professor Department of Biology, Concordia University Email: dylan. fraser@concordia.ca Tel: (514) 848-2424 ex. 8729 Lab website: www. dylanfraser.com



Photo by Nicholas A. Tonelli/ CC BY

Jobs

Graduate student positions

Population genetics/genomics of Gulf of Mexico Fishes. University of Southern Mississippi.

A graduate assistant position (M.S. or Ph.D) is available in our laboratory to work on population genetics/ genomics of reef fishes exploited in the Gulf of Mexico region. Current lab projects include exploitation of RAD-Tag sequencing data to generate linkage maps and/or analyze spatial genetic variation and population structure with application to the management of aguaculture programs and fisheries conservation. The successful applicant will be provided a 12-month full-time Research Assistantship with a tuition waiver. Candidates should possess a Bachelor's degree in a relevant field (e.g. Biology, Ecology & evolutionary biology, Fisheries science, GPA > 3.5) when applying for this position. Skills in programming/script-writing and experience with molecular techniques are strong assets. The position is available starting fall 2017. Interested individuals should send a CV, GRE scores, and unofficial transcripts to: Eric Saillant, Ph.D, Associate Professor, Department of Coastal Sciences, The University of Southern Mississippi Gulf Coast Research Laboratory 703 East Beach Drive Ocean Springs, MS, 39564 Tel. (1) 228-818-8007 Fax (1) 228-872-4204 E-mail: eric.saillant@ usm.edu

Sructure of cobia in North Carolina and Virginia

Responsibilities: Estimate stock structure of cobia using telemetry and population genetics in coastal North Carolina and Virginia. Capture cobia, implant transmitters, maintain receiver array, and analyze fish movement data. Identify stocks based on movement and genetic samples. Location: Department of Applied Ecology, North Carolina State University Categories. **Salary:** Competitive 12 month stipend, health benefits, and tuition waiver. **End Date:** Until filled **Qualifications**: B.S. or B.A. in a biological science. Strong GRE scores and undergraduate GPA. Physical ability to conduct field research; experience with field biology, boating, quantitative analyses, writing, and public speaking; SCUBA certified (preferred); and ability to excel in a multidisciplinary research environment. Anticipated start date is July 2017. Contact: E-mail letter of interest, resume, unofficial copies of GRE scores and college transcripts, and contact information for three references to: jabuckel@ncsu.edu. https://cmast.ncsu.edu/buckel/

Fish Conservation Genetics at Austin Peay State Uni. Description: A research assistantship is available through the Center of Excellence for Field Biology (CEFB) and Department of Biology at Austin Peay State University (APSU) with an intended start date in early July 1, 2017.

AFS Genetics Section Job Board

For additional job postings, be sure to watch the job board on the Section website

genetics.fisheries.org/jobs

The successful applicant will investigate the conservation status and genetic diversity of the imperiled Piebald Madtom (Noturus gladiator). Work will include field surveys and collection and analysis of next-generation sequence data to address specific questions related to the Piebald Madtom to fulfill research requirements of an M.S. thesis-based degree in Biology at APSU. The successful applicant will be supported as a Graduate Research Assistant that includes payment of tuition, fees, an academic year stipend for two years, and three months of summer salary each year (totaling ~\$19,000/ year). Additional resources such as field vehicles and all necessary lab equipment will be available for use through the CEFB. **Contact** email: johansenr@apsu.edu

Professional positions

Lecturer in Fisheries Biology and Ecology. Western State Colorado University.

Responsibilities: Primary teaching responsibilities include lecture and laboratory courses in ecology, fisheries, environmental biology, cell biology, special topics and other courses in support of the degree program in biology. Developing undergraduate research projects and seeking external funding are expected. The position requires teaching about 21 credits per academic year while conducting fisheries related research involving undergraduate students. Responsibilities also include fisheries and molecular biology program development, biology program promotion, supervision of undergraduate extracurricular activities, service to the Thornton Undergraduate Research Program in biology, and continued professional development. Qualifications: A Ph.D. in biology. Demonstrated research topics must include the use of molecular or genomic data and techniques to address questions related to fish biology, fisheries management, or related fields. Salary: \$39,000-\$40,000 Annually. Closing Date: 3-27-2017 Contact: Dr. Robin Bingham, rbingham@ western.edu Apply online at www.western.edu/jobs.

Workshops

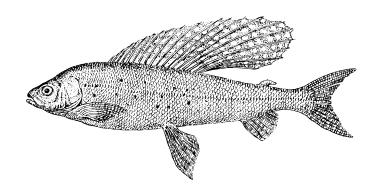
Workshop on Molecular Evolution - Woods Hole, MA. Convening for its 30th year at the Marine Biological Lab in Woods Hole, MA, the Workshop on Molecular Evolution will be held July 20-30, 2017. The Workshop is the premier program for integrating the methods, theory, and applications of molecular phylogenetics, statistical genetics, molecular evolution, and related disciplines. Students work closely with internationallyrecognized scientists, receiving (i) high-level instruction in the principles of molecular evolution and evolutionary genomics, (ii) advanced training in statistical methods best suited to modern datasets, and (iii) hands-on experience with the latest software tools (often from the authors of the programs they are using). The material is delivered via lectures, discussions, and bioinformatic exercises motivated by contemporary topics in molecular evolution. A hallmark of this workshop is the direct interaction between students and field-leading scientists. The workshop serves graduate students, postdocs, and established faculty from around the world seeking to apply the principles of molecular evolution to questions of both basic and applied biological sciences. A priority of this workshop is to foster an environment where students can learn from each other as well from the course faculty. As the course progresses, participants learn how to use the following software to address questions concerning the origins, maintenance, and function of molecular variation: ASTRAL, BEAST2, BEST, BPP, FASTA, FigTree, GARLI, MIGRATE, MAFFT, MP-EST, RaxML, RevBayes, PAML, PAUP*, Phybase, ipyrad and SVD Quartets. Students will have the opportunity to work with software on their own laptops as well as receive training on how to use the same programs on a high performance computer cluster. Deadline for applications is April 7, 2017: https://ws2.mbl.edu/ studentapp/studentapp.asp?courseID=3DMOLE More information on the Workshop is available on the dedicated course website: https://molevol.mbl.edu/ index.php/Main_Paget For further information, please contact Workshop co-Directors: Anne Yoder (anne. yoder@duke.edu) and Joseph Bielawski (j.bielawski@ dal.ca)

Genetic data analysis/exploration using R

This course will be delivered by Dr. Thibaut Jombart who authors the adegenet package and Dr. Zhian Kamvar and will run from the 23rd- 27th October at Margam discovery centre in Wales, United Kingdom. **Course Overview:** This course provides a comprehensive introduction to exploratory statistical methods used in population genetics and molecular ecology. Participants will become proficient in a range of approaches for uncovering genetic structures from

usual genetic data including most genetic markers (e.g. microsatellites, SNPs, AFLP) and genetic sequences (DNA or amino-acid). After covering different types of phylogenetic reconstruction, and basic population genetics tests, a strong emphasis will be put on using factorial methods (e.g. Principal Component Analysis) for investigating genetic diversity. In particular, we will focus on the identification and description of genetic clusters, and on characterising spatial genetic patterns. The last day of the course will be an open problem day, where participants will be able to analyse their own data. Day 1: Intro to phylogenetic reconstruction. Day 2: Intro to multivariate analysis of genetic data. Day 3: Exploring group diversity. Day 4: Spatial genetic structures. Day 5: Using R for reproducible science. If you have any questions please visit www.prstatistics.com. To book online go to http://www.prstatistics.com/course/ genetic-data-analysis-exploration-using-r-gdar03/.

Significance of sexual selection for pop. fitness 28-31 August 2017. Fafleralp, Swiss Alps (CH). More info: and registration: https://www.cuso. ch/activity/?p=3D1128&uid=3D3366 Organizer: Prof. Claus Wedekind, University of Lausanne (CH) Invited Speakers: Prof. David Berger, University of Uppsala (SE) Prof. Andrew P. Hendry, McGill University (CA) Prof. Hanna Kokko, University of Zürich (CH) Prof. John Pannell, University of Lausanne (CH) Prof. Jacek Radwan, University of Poznan (PL) Prof. Leigh Simmons, University of Western Australia (AU) Course description: Sexual selection is expected to promote population fitness by enhancing the reproductive success of individuals of high genetic quality (i.e. of high breeding value for fitness), or by purging the genome of deleterious mutations, e.g. via mate preferences for condition-dependent traits or dominance fights within sexes. The significance of such effects is not sufficiently understood yet. Estimates range from minor importance to the benefits of sexual selection even outweighing the costs of sex. We will discuss the problem in the context of current environmental changes and the potential of rapid evolution. **Queries** caroline.betto-colliard@unil.ch



Comic



Comic by Alper Uzun, PhD/ CC BY-NC-ND 3.0

Section officers, committees, and representatives

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Hall of Excellence Robin Waples

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